Corrosion of Tubes.-—The causes of corrosion in condenser tubes are still somewhat obscure, but organic matter in the circulating water seems to facilitate the corrosion. A Committee of the Institute of Metals is at present engaged on research work on the corrosion of condenser tubes, and some interim reports have been presented. Some of the conditions which cause or facilitate corrosion are discussed in a suggestive article on " Condenser Corrosion " by W. Ramsay, F.I.C. in *Engineering,* I3th July, 1917, and in a paper read by Engineer Lieutenant-Commander G. B. Allen before the Institute of Metals-, i6th September, 1920, on " Service Experience with Condensers "; see *Engineering,* 24th September, 1920.

Evaporative Condensers.—This type of condenser is serviceable mainly for small steam-power installations where there is little condensing water available at a reasonable cost. It is usually arranged as a series of pipes exposed to the atmosphere, the steam condensing inside the pipes. To facilitate the cooling action of the atmosphere, water is allowed to trickle over the outside of the pipes, and some of this water is evaporated and absorbed by the surrounding atmosphere. The amount of heat absorbed by the evaporation of each pound of water is shown, by the graph in fig. 29, p. 251, and roughly it may be taken that the amount evaporated when working at normal full load is nearly equal to the amount of steam condensed.

Although the amount of cooling water required is small when compared with that needed for the other types of condensers, the evaporative condenser suffers from serious disadvantages. Large surfaces are required because of the low rate of heat transmission between the condensing steam and the atmosphere, particularly when the atmosphere has a high temperature and is already nearly saturated with water vapour. There are also numerous joints liable to leakage of air, with the result that the vacuum is often poor compared with that obtainable with the other types of condensers under normal conditions. Fans have been tried in some cases to increase the

condensing capacity by increasing the velocity and amount of air passing the surfaces, but these appear to be regarded with disfavour because of the power required to drive the fans, and the cost of upkeep and renewal.

The commonest arrangement of evaporative condenser is that shown in fig. 13, as made by Messrs. Ledward & Beckett, Ltd. It is built up of a series of cast-iron pipes of corrugated section longitudinally, connected at the top to the exhaust main and at the bottom to the air-pump suction pipe. The pipes are usually 5 in. inside diameter inside the corrugations, and have a maximum diameter externally of 10 in. They are made in standard lengths bolted together at the flanges and return bends. Any convenient number of these condenser elements can be thus connected.

The condenser is usually placed in an elevated and exposed position on the top of the power-house, and sometimes it is convenient to allow the water of condensation to drain directly into the hot-well in the same manner as the water in a barometric jet condenser. A cast-iron tank is situated under the condenser to contain the body of circulating water which is raised by a centrifugal pump into the distributing trays or spreaders over the pipes.